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Bumper mounts fabricated for forward deployed robots

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WRIGHT-PATTERSON AIR FORCE BASE, Ohio — Engineers at the Air Force Research Laboratory's Materials and Manufacturing Directorate (ML) have fabricated and delivered a bumper mount and ramp which allows deployed forces to carry small robots on the back of armored Humvees.

The bumper mount and ramp, delivered to meet a request the directorate received from United States Central Air Forces and Air Combat Command in November, allows explosive ordnance disposal (EOD) people who transport and operate robots to haul them without having to use a trailer. Robots are used for a variety of force-protection, counter-terrorism and EOD operations, including improvised explosive device neutralization and reconnaissance.

"The modified bumper mount and bi-fold, quick-release ramp technologies will have significant value to personnel conducting EOD and counter-terrorism activities in forward deployed locations such as Operation Iraqi Freedom," said Marshall "Doc" Dutton, an engineer from ML's force protection branch at Tyndall Air Force Base, Fla. "The technologies overcome challenges related to the complicated assembly of ramps currently being used and show significant advantages over trailers, which have limited maneuverability. Deploying this technology is expected to increase the safety of EOD personnel, who have had to manually approach Improvised Explosive Devices when the current trailer and ramps' limitations impede the deployment of a remotely-operated system or robot."

Just a few days after receiving the request, ML engineers identified a commercial off-the-shelf, all-terrain vehicle mount, which was compatible with a class-three universal trailer hitch, and could be used, in conjunction with a ramp, to mount and carry the robots. Teaming with Discount Ramps in West Bend, Wis., six prototype bi-fold ramps were fabricated.

"Testing conducted by (ML) engineers demonstrated that the improved ramps have significant benefits over those commercially developed and available to the commercial market," Mr. Dutton said. "Battlefield advantages include durability and easy assembly and use, which warfighters require while in dangerous or life-threatening situations. In fact, we were able to drive a 750-pound (all-terrain vehicle) and its operator, which far exceed the weight of a small robot, onto the ramp and mount it on a Humvee."

AFRL's Al Hartzog and Darrell Stepp, Applied Research Associates, postion the modified bumper mount on an armored Humvee, similar to the ones used in Operation Iraqi Freedom. (Air Force photo)

Developed by a subsidiary of Northrop Grumman Corporation, the Andros Mark VI robot is one such robot currently being used in support of Operation Iraqi Freedom that will be carried using the new technologies. Andros Mark VI is a heavy-duty, all-terrain, multi-tracked hazardous duty vehicle that is equipped with manipulator arm, gripper, TV cameras, lights and two-way audio. The robot weighs about 350 pounds, is 60 inches long and remotely operated using an operator control unit. @